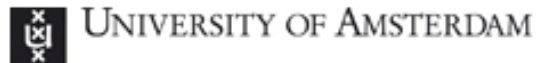# Creating a SARNET Alliance
by applying the Service Provider Group Framework and using the Ciena/GENI testbed

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Cyber Security readiness

Secure Transport

Alliance

Detect & Filter

Protective Perimeters

Creating a SARNET Alliance
Sharing intelligence and defensive power

SARNET
Security state / defense tactics automation

SARNET
Topology dynamics

SARNET Ciena Booth #933

SARNET Alliance research

Why: **Understand the value of collaboration** between alliance members in terms of **risk reduction** increasing trust**, cost benefit and revenue impact.**

What: Provide **a-priori insight** into the **rationale of creating an alliance**.

How: Use the **Service Provider Group Framework*** to institutionalize **trust** by arranging common **rules**, its **execution** (administration & enforcement) and **judgement**.
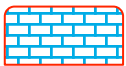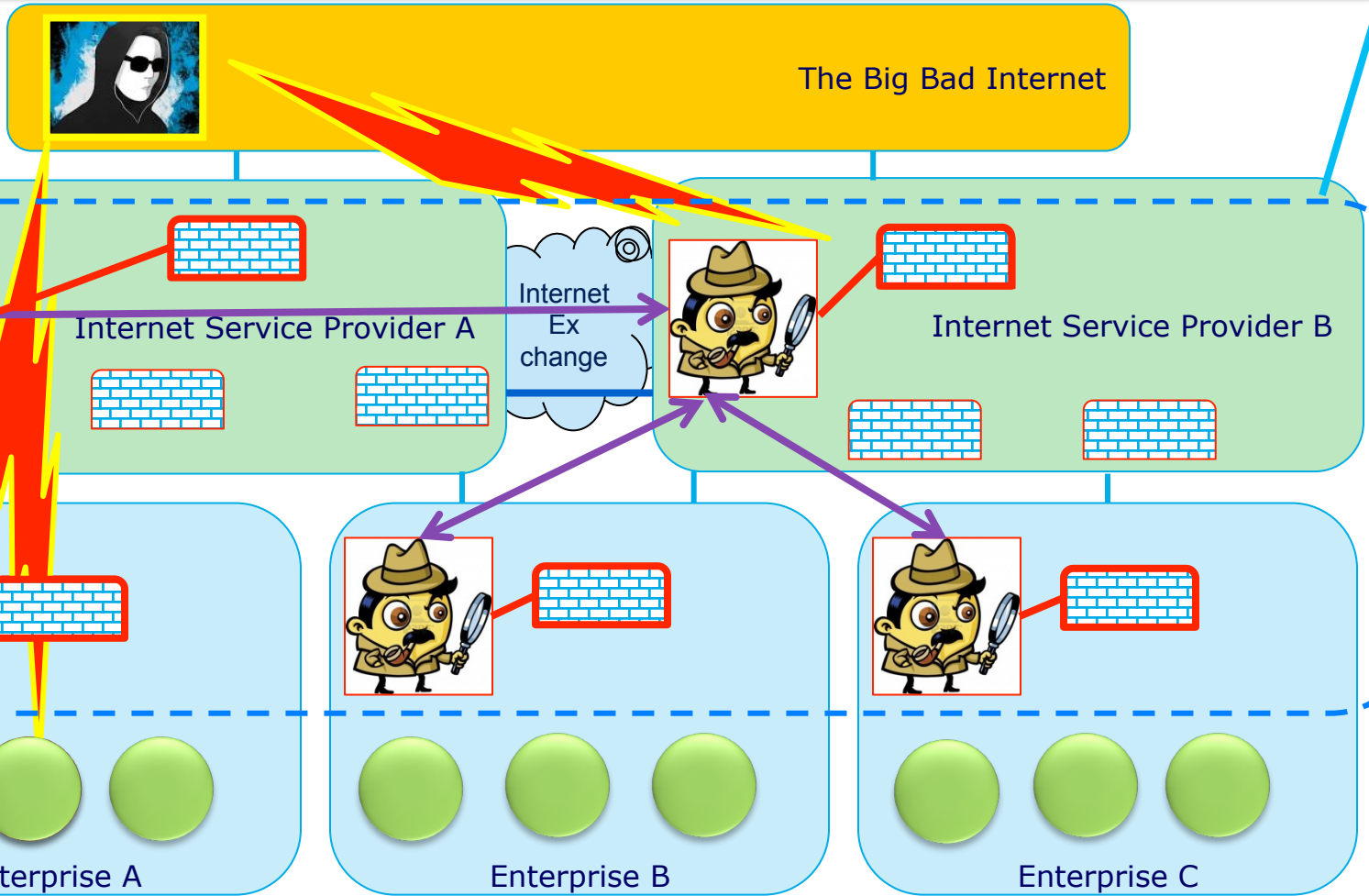
With what: A distributed computational model of an alliance that analyses the **policies** each autonomous member constructs from the common set of **rules**.

Result: The models can become base of an **Information Security Management System** that establishes, reviews, maintains and improves information security amongst alliance members.

* Leon Gommans, John Vollbrecht, Betty Gommans-de Bruiijn, Cees de Laat, **The Service Provider Group framework A framework for arranging trust and power to facilitate authorization of network services,** Future Generation Computer Systems 45 (2015) pg. 176–192
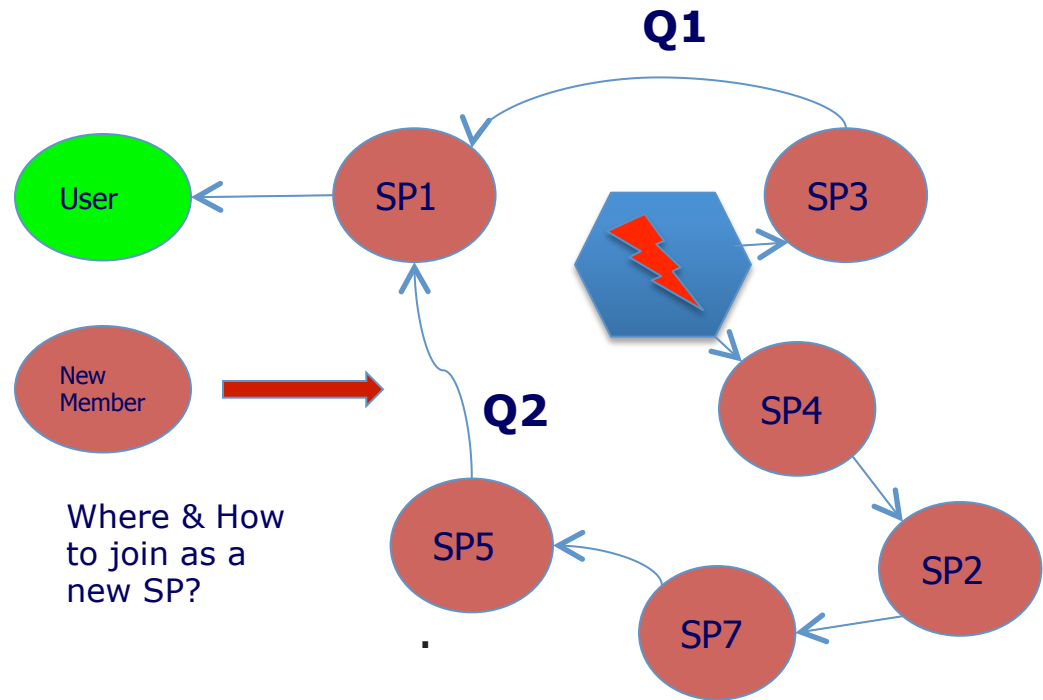
Creating an Alliance via bi-lateral agreements

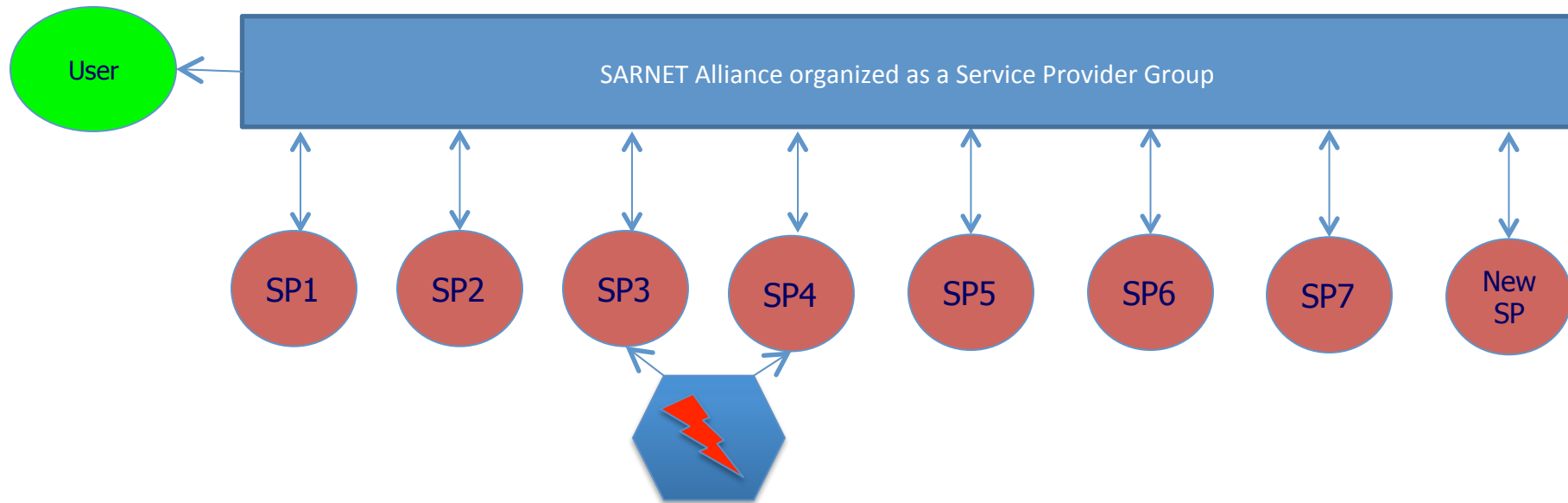Different Service Providers may deliver the same security intelligence to SP1.

Delivery of intelligence will most likely be at different quality (Q1/Q2) e.g. considering the speed of detection.

A user, expecting consistency, may be unaware of the difference in quality SP1 decides to select.

How does each member benefit from sharing intelligence or offering defence?

Q1

User

SP1

SP3

New Member

Where & How to join as a new SP?

Q2

SP4

SP5

SP2

SP7

Service Provider Group Examples

A Service Provider Group (SPG) is an organisation structure providing a defined service only available if its members collaborate.

Examples:

Establishing an Alliance as a Service Provider Group

- The user signs an agreement with the SPG (may use one of the SP's as proxy).
- The SPG arranges uniform delivery quality to a user
- SPG provides common rules for new members, creating trust between members.
- SPG may enforce service quality of each member
- SPG may act as an exchange for security services
- SPG may clear & settle value exchanges between members for services provided/used

Service Provider Group Characteristics

- Autonomous members acting together on a decision to provide a service none could provide on its own.

- Appears as a single provider to a customer.

- Appears as a collaborative group to members with standards, rules and policies that are defined, administered, enforced and judged by the group.

- Autonomy in the group: every member signs an agreement declaring compliance with common rules, unless local law determines otherwise.

- Membership rules organizes trust amongst members and manage group reputation and viability.

Service Provider Group value
Our next step

Understand the value of collaboration by

- Applying Agent Role Modelling in multi-domain scenario's

  - Agents are self governed autonomous entities that pursue their own individual goals based only on their own beliefs and capabilities (Abdelkader, 2003).

- Modelling Normative and Institutional context

  - Inter-agent description

    - Message Sequence Diagram

    - Topology

  - Identify an intentional/institutional factors

- Create executable model to research how policies, applied by each autonomous member and common regulation affects **trust in the group** and **member cost & benefits.**

# Observe SARNET Alliance as a SPG system in terms of risk, cost & benefits
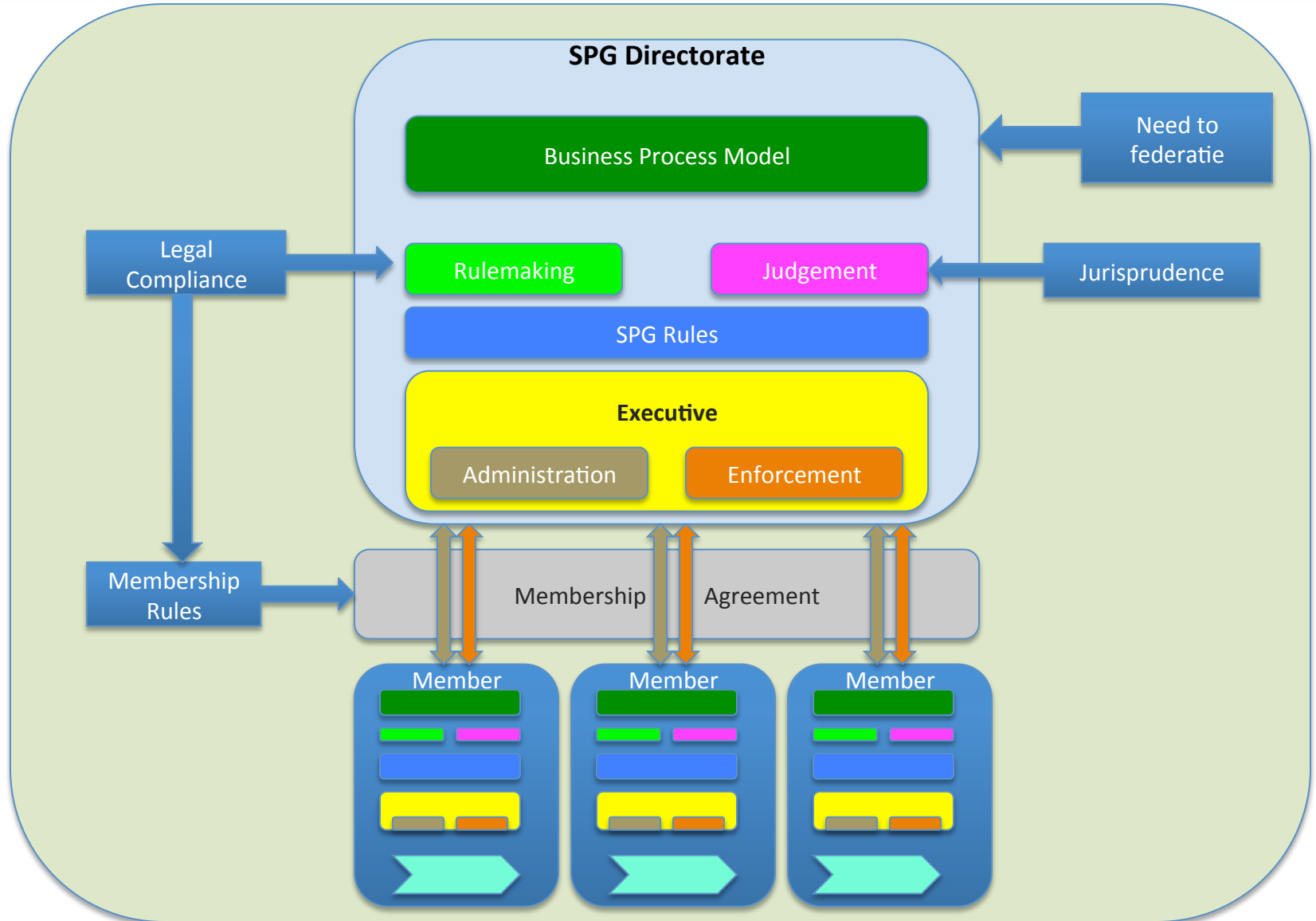
Agent Based Modelling Framework

Main component	
Signal layer	Message / Act
Action layer	Action / Activity
Intentional layer	Intention
Motivational layer	Motive

In our model, we refer to four layers of components:

➢ the signal layer— describes acts, side-effects and failures showing outcomes of actions in a topology.
➢ the action layer—actions: performances that bring a certain result,
➢ the intentional layer—intentions: commitments to actions, or to build up intentions,
➢ the motivational layer—motives: events triggering the creation of intentions.

Simplified Eduroam case at signalling layer
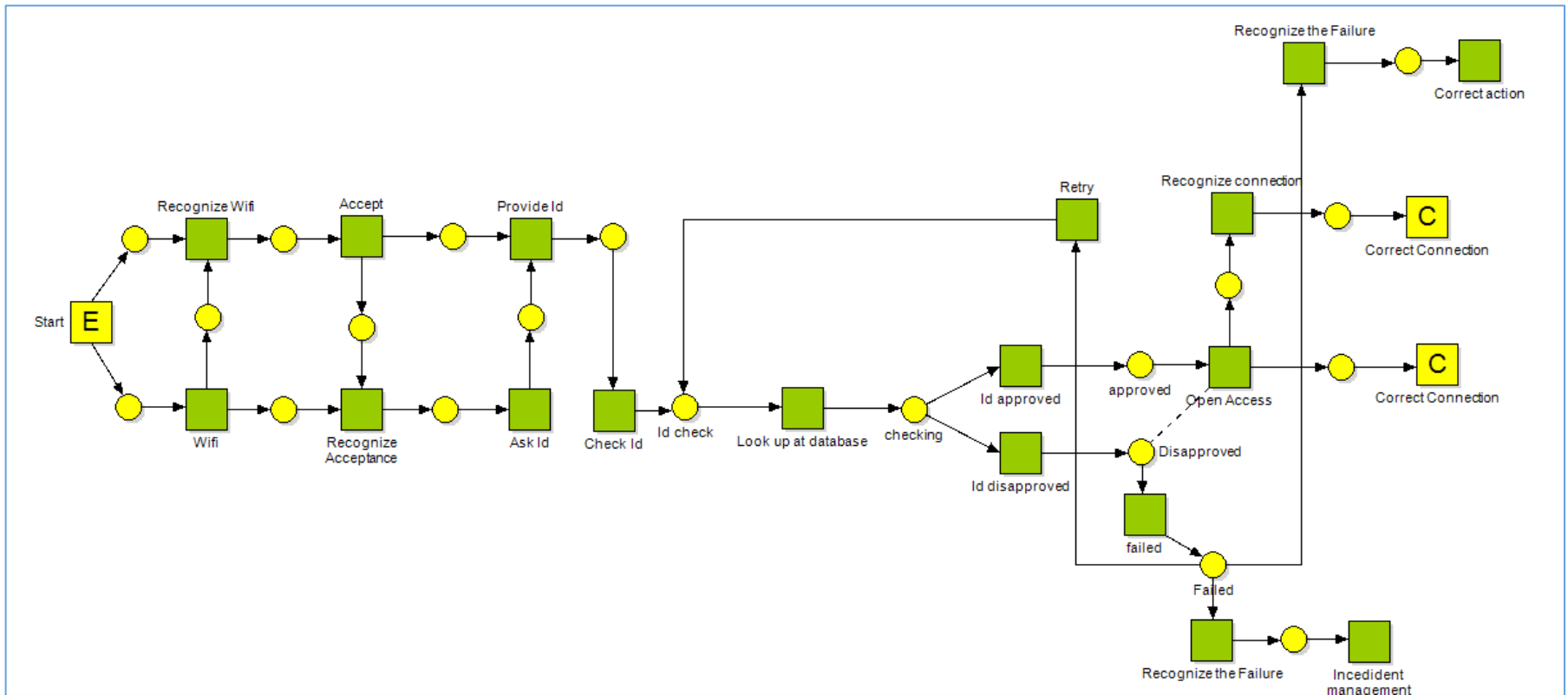
Petri net of EduRoam Case
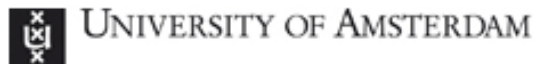(first step)
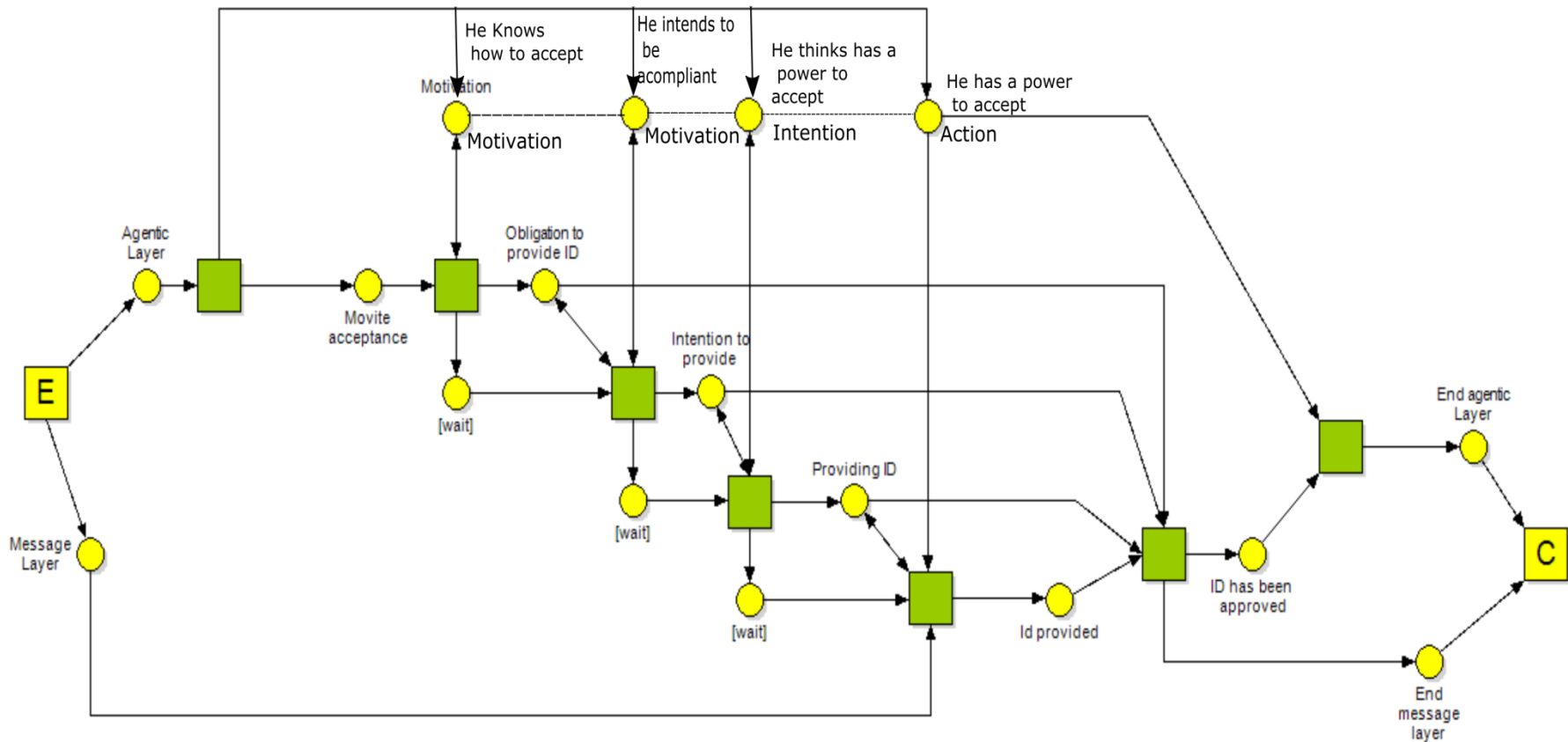
Petri net of EduRoam Case

Status & next steps

Establishing relationships with Cybersecurity Service Provider Industry to better understand requirements to be modeled.

Initial steps are taken to use Agent Based Modeling as a way to observe and describe a Service Provider Group:

- Eduroam SPG as a first case:
    - Step 1: Interaction Student – Campus network (as Service Provider), which authorizes local WiFi access. Way of working has been recently submitted as a position paper to ICAART 2016 conference on Agents and AI.
    - Step 2: Add interactions between Service Providers that implement roaming (identity federation).
- Evaluate Eduroam experience with modeling, select a more complex SPG case.

Thank you